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the selection of excessive amounts of acid fruit juices, thus inducing a most distressing colic and intestinal disorder; a short sojourn at a hospital was followed by convalescence.

It is impossible in the space available in these Proceedings to attempt an adequate summary of the results but the accompanying chart indicates the trend of some of the most important factors measured. The detailed results of the research are incorporated in a 416-page monograph issued as Publication No. 203 of the Carnegie Institution of Washington.

THE STUDY OF INDIAN MUSIC

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Presented to the Academy, March 2, 1915

Thirty-five years of acquaintance with Indian music gathered from tribes of different linguistic families widely scattered over North America and a study, still in progress, of the music of a particular group has revealed facts relative to their music and its uses that possess an anthropologic value.

The term music as applied to the Indian refers solely to vocal music; for the natives of America possess few varieties of musical instruments beside the drum and rattle, both of which are used mainly to accent time and rhythm.

The number of Indian songs which have come to my personal attention number many hundreds. Those to which intensive study is being given have been secured from people classed as Plains Indians. All of these songs have been examined under their native conditions and in connection with the ceremonies, secular or religious, of which they were a part. When I began to observe and gather Indian songs, the graphophone was not available for field work. Securing songs by dictation was a difficult and unsatisfactory task for the reason that the Indians so frequently were averse to repeating the songs under observation, particularly when they were religious in character. This obstacle has been entirely overcome by the use of the graphophone, as one singing will give a record that can be repeated any number of times for the purposes of transcription, verification, and other study. For over twenty-five years I have used the graphophone when engaged in the field study of native ceremonies containing rituals and songs.

The word 'song' to our ears, suggests words arranged in metrical form and adapted to be 'set to music,' as we say. The native word

which is translated 'song' does not suggest any use of words. To the Indian, the music is of primal importance, words may or may not accompany the music. When words are used in a song, they are rarely employed as in a narrative, the sentences are not apt to be complete. In songs belonging to a religious ceremony the words are few and partake of a mnemonic character. They may refer to some symbol, may suggest the conception or the teaching the symbol stands for, rarely more than that. Vocables are frequently added to the word or words to eke out the musical measure. It sometimes happens that a song has no words at all, only vocables are used to float the voice. Whether vocables alone are used or used in connection with words, they are never a random collection of syllables. An examination of hundreds of songs shows, that the vocables used fall into classes; one class is used for songs denoting action, another class for songs of a contemplative character, and it is also noted that when once vocables are adapted to a song they are never changed but are treated as if they were actual words.

As Indian music is exclusively vocal, its range is confined to the compass of the human voice, which rarely exceeds three full octaves. This limited range, taken with its strictly vocal character, places Indian music in a class apart from the 'culture music' of our race. The remarkable development of 'culture music' has been due, in a large measure, to the invention and use of musical instruments. By means of these instruments the range of musical sounds has been increased far beyond that possible to the human voice and different qualities of tone have been secured. As a result, 'culture music' has been able to use diversity in musical sounds, to employ various melodic and harmonic forms and to acquire an objective and intellectual character quite impossible to the simple song from which it sprang. By the study of Indian music it is possible to retrace some of the steps that have led from song to 'culture music.' In pursuing this task, an important and helpful factor is found in certain conditions that have here obtained, namely: the natives of this continent, previous to the coming of our race, had not been subjected to inroads from alien peoples who might have disturbed the continuity of aboriginal culture; consequently the music and the life of the Indians can be observed in a simple, rather than a 'compound' environment.

Indian music presents several aspects to the student, all of which fall into two classes; the one technic, the other psychic in nature. The technic class has already received considerable attention from scholars, as to the tones used, the order in which they occur, the relation of this

native order to the formulated scales of 'culture music,' native musical form, melody, rhythm and the interrelation between different rhythms maintained by the voice and the drum or rattle.

From a present study of some of the psychic aspect of Indian music I have already reached certain conclusions, some of which are here presented.

Among the group of Indians whose music is under observation, the following customs, observed in some of the tribes, illustrate something of the fundamental character of the personal and emotional elements found in Indian song.

When at puberty the youth passes through the fasting rites introductory to the duties pertaining to manhood, 'the vision' that then appears to him, becomes his most sacred, personal experience, one that he never fully shares with another, and the cadence, or song, that generally accompanies the 'vision' remains in his memory and is to the man his secret personal appeal to the unseen powers he believes to have control over his life. This strain of music, constitutes his personal prayer, his cry for help in his hour of need. These 'songs' are strictly individual and emotional. They are rarely, if ever, heard by anyone save the singer.

Again: Certain societies require that each member have a special song, this song is generally of the man's own composition, although sometimes these songs are inherited from a father or a near relative who when living had been a member of the society. These individual songs are distinct from songs used in the ceremonies and regarded as the property of the society, although the members are entitled to sing them on certain occasions. When this society holds its formal meetings a part of the closing exercises consist of the simultaneous singing by all the members present of their individual songs. The result is most distressing to a listener, but there are no listeners, unless by chance an outsider is present, for each singer is absorbed in voicing his own special song which is strictly his personal affair, so that he pays no attention to his neighbour, consequently the pandemonium to which he contributes does not exist for him. Another phase of Indian song is here exhibited, but it is more directly connected with the Indian's manner of singing than with the music itself. This manner has tended to influence the estimation of outsiders of Indian song.

In a general way, an Indian singer makes no special effort, nor is he much concerned, to present his song in such a way as to give to the listener a musical picture. Practically no attempt is made to give what we call 'expression.' The song is apt to move along in strict time; any

change or break in the time or rhythm disrupts the flow of the music and, to the Indian, destroys the symmetry of the song. The Indian's manner of singing, his method of rendering his song is the outcome of the close emotional relation between the singer and the music. To a degree, it may be said that the Indian does not listen to his song as something objective to himself, yet he is found to be keenly aware of any slight change in the rhythm or tones of a melody—any mistake in the rendition of a song. In some societies a fine is imposed upon a member who makes mistakes in singing the songs. Years of experience has shown an unfailing demand for accuracy in the transcription and reproduction of a song. This demand betrays a consciousness and a recognition on the part of the Indian of musical form, both as to rhythm and the succession of tones that form a melody. In this consciousness is discerned one of the very early steps in the long path that leads to an artistic development of music.

Accuracy in the observance of religious rites arises from certain beliefs concerning the ability of these rites to open a way to the unseen powers, mistakes 'make the path crooked.' Indian ceremonies are ritualistic and symbolic objects are generally present. These objects have to be handled in peculiar and definite ways, with certain movements of the body and hands and accompanied by long recitations either chanted or intoned. Mistakes must be avoided as any carelessness is believed to be punished by supernatural means, therefore various mnemonic devices are employed by those who officiate, to insure against mistakes. In some tribes, if a mistake chances to be made in certain ceremonies, everything stops at the instant it is discovered. When the ceremony is resumed, it must start afresh, as though it had never been begun. Ceremonies that have elaborate rituals are generally attended only by the initiated and the rituals recited are known only to those who have paid the costly fees required from those who seek to be instructed in their use. In some ceremonies where lengthy intoned recitations occur these rituals are broken in upon by songs, sung by those officiating. These interpolated songs partake of the general character of Indian music and are emotional in their nature. The few words usually refer to the symbolic objects belonging to the ceremony,—the mind is thus directed toward the sacred object and the emotion evoked by the thought of it and its helpful relation to the people finds expression in the music. An old priest explained this introduction of songs into the long rituals, by saying: "The words talk to us, but harmonious sounds unite the people!" This explanation given by the old priest is confirmed by observations made as to the effect of songs pertaining to ceremonies having for

their purpose the stimulation, among the people taking part, of a common recognition, as of the gift of food, the value of tribal unity, of peace within or without the tribe. Many of the songs belonging to this class of ceremonies, although led by those who officiate in the rites, are sung by all present, men, women, and even children joining in these songs. The singing is always in unison, the personal emotion of each singer adds to the psychic force bred of a social accord, as all the people in one voice sing their thanks to the Unseen Giver of Life.

On a similar but lower plane are the songs belonging to vocations, by these not only are the hands strengthened for their task, but the unison singing of the song helps to development of social consciousness.

From what has been stated above it will be apparent that a wide field is opened by the study of Indian music not only concerning the beginnings of 'culture music' but in revealing the psychic influence of song upon the individual and upon his social development.

SOME RECENT ANTHROPOLOGICAL EXPLORATIONS

By Ales^v Hrdlicka

DIVISION OF PHYSICAL ANTHROPOLOGY, U. S. NATIONAL MUSEUM, WASHINGTON
Presented to the Academy, March 2, 1915

In 1912 an arrangement was entered into by the Smithsonian Institution and the Panama-California Exposition at San Diego, by which it became possible to send out jointly a number of anthropological expeditions for the purpose of furnishing the Exposition with original material for its exhibits, and of serving the Smithsonian Institution and the science of anthropology by advancing knowledge in directions in which progress was especially desirable.

The objects particularly aimed at in the latter respect were the promotion of research into man's antiquity; the survey of certain parts of northern and eastern Asia in quest of possible traces of racial connection with America; and the accumulation of reliable data on child development in certain primitive races under widely differing environments. Owing to illness in the personnel of the expeditions, to the European war, and other untoward circumstances, only a part of these plans could be fully carried out; but the results are of sufficient importance to encourage further activity in the directions named.

The several expeditions and their results, briefly outlined, were as follows:

Ancient Man in Europe and Asia. Field work was done by J. Matiegka, head of the Anthropological Bureau of the Bohemian University